

What's the best municipal solid waste management plan for Lebanon?

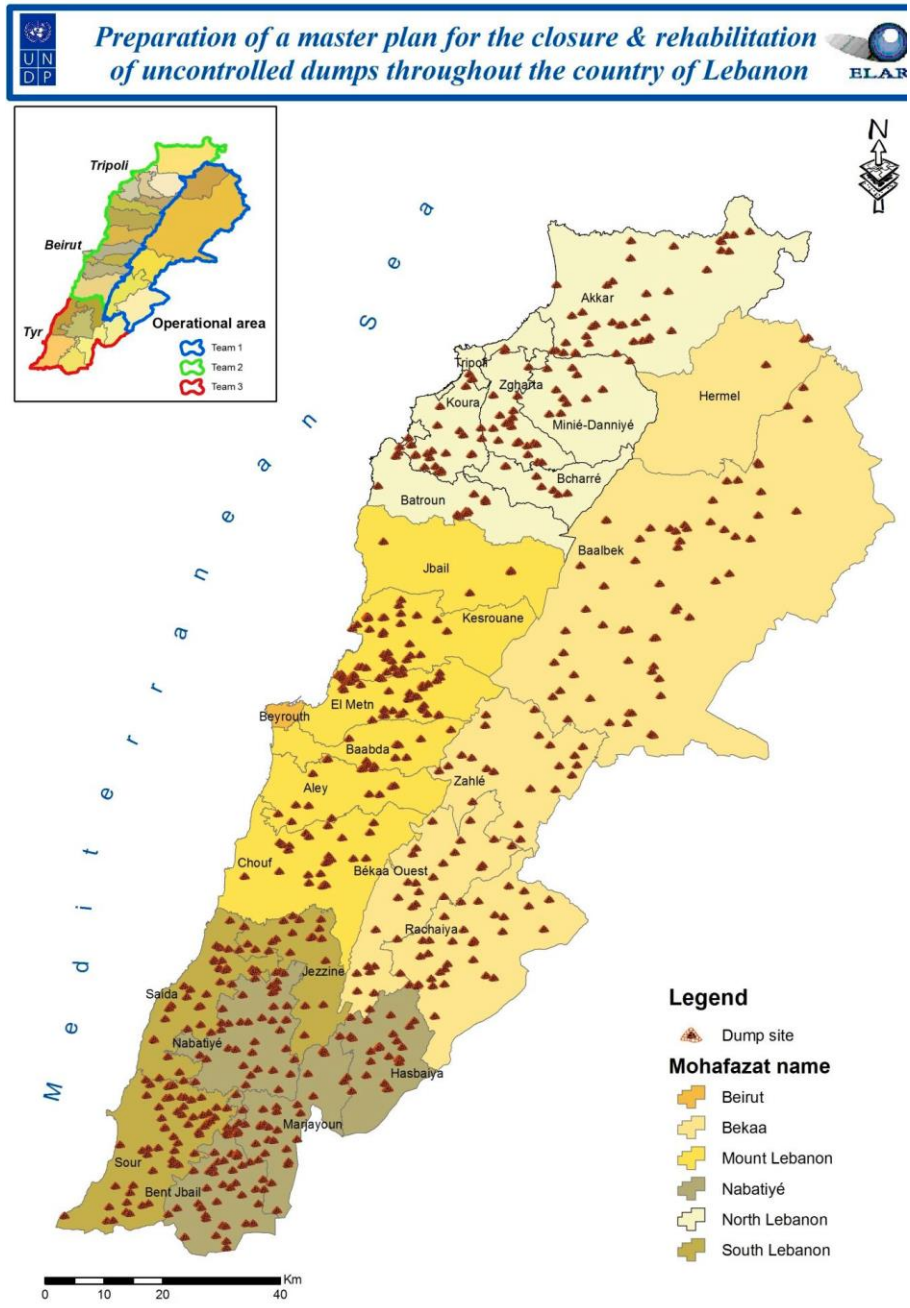
Some essential public policy considerations

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Context

- Waste structure: 5600 tons/day (650 tons/d in Beirut city), mostly organic (52%); little sorting at source; consumerist culture
- Institutional structure: pervasive [corruption](#) and mismanagement in the sector
- Fragmentation of public authority: CDR (main player), MoE, OMSAR (with sizeable [EU grants](#)), municipalities
- More than 105 million US\$ spent in the past decade in [grants](#) and loans on the [sector](#) (excluding public funds for the municipal and private operators)



Open dump sites across the country on the rise, range 1,000-3,000 dumps

Main documents and sources

- Ministry of Environment (MoE) official [reports and studies](#)

Key document: *Strategic Environmental Assessment of the Solid Waste Management Plan for Lebanon - [2015](#) ([EU Funded](#))*

- AUB Guide to Municipal Solid Waste Management [2016](#)
- There is no need for new expensive studies and strategies and for re-inventing the wheel at each change in government
- Already more than 12 million US\$ in aid and public funds spent in the last 5 years on developing [strategies](#) and drafting studies

Seven dimensions of an efficient plan

- *Environmental impact* - Does it have low negative environmental impacts?
- *Land use* - Is land requirement limited?
- *Social acceptance* - Is it socially acceptable (traffic, odors, jobs, etc.)?
- *Financial viability* - Is it financially viable (low cost, generates revenues)?
- *Technical complexity* - Is it based on a simple & versatile technology?
- *In-country expertise* – Is the expertise needed available locally?
- *Institutional complexity* – Does it require substantial legal and institutional reforms and improvements?

Incineration is ranked extremely low on all required dimensions for a proper waste management plan

	Sanitary Landfilling	Bio-drying	Incineration (WtE)	Anaerobic MBT (Mechanical & Biological)
Environmental impact	Medium	Medium	High	Medium
Land requirement	High	High	Medium	Medium
Adverse social impact	High	Acceptable	High	Low
Financial viability	Lowest cost	Acceptable	Costly	Acceptable
Technical complexity	Simple	Acceptable	Complex	Acceptable
In-country expertise	Available	Available	Not available	Available
Institutional complexity	Low	Low	High	Low

Incineration costs (300\$/ton) are 4 times higher than other technologies

High investment costs + Treatment costs of toxic residues equal to 5 times the operating costs

	Sanitary Landfilling	Bio-drying	Incineration (WtE)	Anaerobic MBT (Mechanical & Biological)
Residue waste to landfill %	90%	20%	20%	20%
of which Hazardous landfill %	10%	0%	4%	0%
Investment cost (million US\$, 1000 t/day)	30 m\$	45 m\$	160 m\$	61 m\$
Operating cost per ton US\$	12\$	32\$	40\$	38\$
Cost of residues management per ton US\$	20\$	20\$	200\$	20\$
Environmental cost of emissions per ton US\$	3\$	9\$	14\$	6\$
Total cost per ton (annualized)	41\$	69\$	284\$	75\$

Necessary institutional fixes

- Continuity: build on existing studies (public + private) & best-practices
- Decentralization and empowering local solutions, yet benefiting from economies of scale (group min. 300 tons/day)
- Centralized monitoring, oversight and planning (national committee on MSW)
- Centralized financing and budgeting to avoid duplication and wasteful spending
- Contracting based on waste reduction targets (weight-based billing, incentives for sorting at the source & recycling, etc.)
- Basic ethical practices: no conflict of interest, competitive bidding (including on consultancy contracts)...
- Uphold international treaties and conventions ([Barcelona Convention](#) on Protection of the Mediterranean...)

Examples of key pending legislation

- Law for Integrated Solid Waste Management
- Law for the Protection of Air Quality
- Law for the Protected Areas
- Application Decree for the Organization of the Environmental Police
- Application Decree for the National Environmental Fund

Elements of an alternative plan (1-2 years)

- Comprehensive plan for the entire Lebanese territory
- Group areas into 4-5 economic zones, based on urban concentration
- Union of municipalities, under central gov. oversight and support
- Implement sorting at the source + target 80% recovery
- One Anaerobic MBT plant per region, with a dedicated sanitary landfill site
- Total landfill area required less than 100 ha (0.01% of Lebanon); Rehabilitate uncontrolled dumps and [quarries](#)
- Total cost of the 5 plants AND the rehabilitation and closure of all uncontrolled dumps is cheaper than 2 incinerators